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(54) **CONNECTOR AND ELECTRONIC DEVICE**

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Description

Cross Reference to Related Applications

[0001] This application claims the benefit of and priority to the Chinese Patent Application No. 202110971239.3, filed to the Chinese patent office on August 24, 2021 and entitled "Connector and Electronic Device".

Technical Field

[0002] Embodiments of the present application relate to the technical field of connectors, in particular to a connector and an electronic device.

Background of the Invention

[0003] At present, with the rapid development of economy in China, a generator set, a test device and products such as a mobile power supply vehicle, a mobile power generation vehicle, a UPS power supply vehicle, a power battery charging pile and an electric vehicle charging pile with electricity as motive power have been widely applied to bring great convenience for the life and production of people, and therefore, a power battery charging connector is needed for high-capacity current transmission within short time.

[0004] It was found by the applicant of the present application in a process of implementing the present application that, when the connector is pulled out under the condition that a heavy load is connected, the risks of instant ignition and short circuit easily occur, thereby easily causing the direct scrap of the connector, and even, causing safety accidents. DE102009044179A1 discloses a part with a locking element comprising a securing part that is engaged to a securing recess. When the part is coupled to a power input connector part. A position sensor is associated with a switch circuit for closing a current circuit through the charging connector. A manually releasable locking device locks an actuating element against actuation. The position sensor is operatively connected with the locking device such that the current circuit through the charging connector is interrupted during operation of the locking device.

[0005] US20170062986A1 discloses a connector being mateable with a mating connector along a predetermined direction. The connector comprises a mated-state detection member and a holding mechanism which includes a reference surface, insulating portions and an insulating external wall. Each of the insulating portions projects from the reference surface by a first predetermined length in the predetermined direction. The insulating external wall projects beyond the reference surface in the predetermined direction and surrounds the insulating portions in a plane perpendicular to the predetermined direction. The mated-state detection member is held by the holding mechanism and is movable between a projecting position and a receding position in the pre-

determined direction. The mated-state detection member at the projecting position projects from the reference surface by a second predetermined length which is shorter than the first predetermined length. The mated-state detection member is moved to the receding position by the mating connector mated with the connector.

[0006] CN112038843A discloses a new energy automobile charging gun, a charging pile, and a charging method thereof. The new energy automobile charging gun comprises a linkage clamping device, a shell, a first elastic piece, a second elastic piece, a first position detection assembly used for detecting the position of a clamping hook and a second position detection assembly used for detecting the position of a plug pin assembly. The linkage clamping device is adopted to replace an electronic lock in an existing charging gun, the charging gun can be controlled to be powered off by manually moving the plug pin assembly, after the sliding pin of the plug pin assembly is inserted into the plug pin groove of the clamping hook, the pressing assembly is pressed down to enable the clamping hook to rotate, and therefore locking between the clamping hook and an automobile charging interface is relieved.

[0007] EP3122589B1 discloses a plug-type apparatus which is in the form of a coupling or plug. The plug-type apparatus comprises electrical components and a movable locking operating unit for locking the plug-type apparatus in the plug-connected state with a plug-type apparatus which complements said plug-type apparatus, and also a housing within which the electrical components and the locking operating unit are mechanically held. The housing is constructed from at least three housing parts, wherein the first housing part, together with a second housing part, forms a first housing chamber so as to form a bearing edge which runs along the outside of the housing, and at least one further housing chamber is formed between the second housing part and at least one further, third housing part. The second housing part extends between the first housing chamber and the at least one further housing chamber, the locking operating unit is mechanically held in the first housing chamber, and the electrical components are mechanically held in the at least one further housing chamber.

[0008] US20120171887A1 discloses an electrical connector for an electric vehicle. A spring latch of the electrical connector is not sealed; instead, the connector body has holes allowing water entering the spring latch mechanism to drain harmlessly out of the connector. A forward-facing LED or other light source acts as a flashlight. Once the connector is connected, the forward-facing LED is switched off, and a rear-facing LED or other light source is switched on to confirm that the connector is connected and capable of charging the vehicle. The connector is produced by over molding in a three-layer configuration, where each layer is formed of a material having advantageous materials for that layer's position in the connector.

Summary of the Invention

[0009] In view of the above-mentioned problem, embodiments of the present application disclose a connector and an electronic device, by which the above-mentioned problem that when the connector is pulled out under the condition that a heavy load is connected, the risks of instant ignition and short circuit easily occur, thereby easily causing the direct scrap of the connector is overcome.

[0010] According to one aspect of embodiments of the present application, discloses a connector. The connector includes a housing provided with an accommodating cavity and a first opening communicating with the accommodating cavity; a circuit board

disposed in the accommodating cavity, the circuit board being provided with a first signal connection point; a connection head disposed on the housing, the connection head including a second signal connection point used to be connected to the external device; and a switch disposed in the first opening, the switch being respectively connected to the first signal connection point of the circuit board and the second signal connection point of the connection head, and the switch being used for controlling the connection or disconnection between the first signal connection point of the circuit board and the second signal connection point of the connection head. The connector includes a first fixing component, the first fixing component is disposed on the housing or the connection head, and the first fixing component is used to be connected to the external device and enables the connector and the external device to be in a primary fixed state. The connector includes a second fixing component, and the second fixing component is connected to the switch. In response to the first signal connection point and the second signal connection point being controlled to be connected by the switch, the switch drives the second fixing component to be matched with the first fixing component or the external device in the primary fixed state to achieve secondary fixation for the external device, so that the external device and the connector are in an undetachable state. In response to the first signal connection point and the second signal connection point being controlled to be disconnected by the switch, the switch drives the second fixing component to be separated from the first fixing component or the external device in the primary fixed state to remove the secondary fixation for the external device, so that the external device and the connector are in a detachable state; the first fixing component includes a threaded structure or clamping structure disposed on the connection head, the threaded structure or clamping structure is matched with the external device so that the connector and the external device are in a threaded

connection or clamped state; the second fixing component includes a connecting arm and a fixing head, the fixing head is disposed on one end of the connecting arm, the other end of the connecting arm is connected to the switch, and the fixing head is used to be fixedly connected to the external device; in response to the first signal connection point and the second signal connection point being controlled to be connected by the switch, the switch drives the fixing head to be fixedly connected to the external device in the threaded connection or clamped state to achieve the secondary fixation for the external device; and when controlling the first signal connection point and the second signal connection point to be disconnected, the switch drives the fixing head to be separated from the external device in the threaded connection or clamped state to remove the secondary fixation for the external device.

[0011] In an embodiment not covered by the claims, the first fixing component includes a rotating arm and a hook, the rotating arm is rotatably connected to the housing, and the hook is fixed to one end of the rotating arm; , the hook and the external device are in the clamped state in a condition that the external device is plugged into the connection head, and the rotating arm is in a first state; the second fixing component includes a limiting and connecting piece, and the limiting and connecting piece is connected to the switch; in response to the first signal connection point and the second signal connection point being controlled to be connected by the switch, the switch drives the limiting and connecting piece to be fixedly connected to and limit the rotating arm in the clamped state, so that the rotating arm is nonrotatable relative to the housing, and then, fixation for the clamped state and the secondary fixation for the external device are achieved; and in response to the first signal connection point and the second signal connection point being controlled to be disconnected by the switch, the switch drives the limiting and connecting piece to be separated from the rotating arm in the clamped state to remove the fixation for the clamped state and the secondary fixation for the external device, so that the rotating arm is rotatable relative to the housing.

[0012] In an embodiment not covered by the claims, the switch includes a switch body and an operation part, the switch body is electrically connected to a power connection point of the circuit board and a power pin of the connection head respectively, the operation part is located in the first opening, is connected to the switch body and is movable relative to the switch body, in response to the operation part located on a first preset position relative to the switch body, the switch body is switched on, in response to the operation part located on a second preset position relative to the switch body, the switch body is switched off, and the limiting and connecting piece is connected to the operation part and moves with the operation part; and in response to the operation part

located on the first preset position, the limiting and connecting piece supports against and abuts with the other end of a first surface of the rotating arm, the rotating arm is fixed relative to the housing, and in response to the operation part located on the second preset position, the limiting and connecting piece is separated from the other end of the rotating arm, and the rotating arm is rotatable relative to the housing.

[0013] In an embodiment not covered by the claims, the housing is provided with a second opening and a through hole which both communicate with the accommodating cavity, the second opening is located between the connection head and the first opening, the through hole and the connection head are located on the same end of the housing; and the rotating arm is located in the accommodating cavity, one end of the rotating arm extends out of the through hole, the rotating arm is swingable relative to the through hole, the hook is located outside the housing, the other end of the rotating arm is exposed out of the second opening, and the limiting and connecting piece is located in the accommodating cavity.

[0014] In an embodiment not covered by the claims, the first fixing component includes an elastic element, one end of the elastic element is fixed to the other end of the first surface of the rotating arm, and the other end of the elastic element is fixed to the inside of the housing.

[0015] In an embodiment not covered by the claims, a fixing groove is disposed in the other end of the first surface of the rotating arm, and one end of the elastic element is accommodated and fixed inside the fixing groove.

[0016] In an embodiment not covered by the claims, a clamping groove is disposed in the other end of the first surface of the rotating arm, and the clamping groove is used for clamping the limiting and connecting piece.

[0017] In an embodiment not covered by the claims, the other end of a second surface of the rotating arm extends towards the second opening to form a limiting button, the limiting button is movable relative to the second opening, wherein the first surface is opposite to the second surface.

[0018] In an optional embodiment, the first signal connection point includes an electric signal connection point and a communication signal connection point; the connection head includes a plurality of electric signal pins and a plurality of communication signal pins, the plurality of electric signal pins are connected to the electric signal connection point of the first signal connection point, the plurality of communication signal pins are connected to the communication signal connection point of the first signal connection point, the number of the plurality of electric signal pins is two, and the number of the plurality of communication signal pins is eight.

[0019] In an optional embodiment, an anti-skid bulge is disposed on the outer side wall of the housing.

[0020] According to the other aspect of the embodiments of the present application, discloses an electronic device. The electronic device includes the above-mentioned connector.

[0021] The embodiments of the present application have the beneficial effects: different from the situation in the prior art, in the embodiments of the present application, the housing, the circuit board, the connection head and the switch are disposed, wherein the housing is provided with the accommodating cavity and the first opening communicating with the accommodating cavity, the circuit board is disposed in the accommodating cavity and is provided with the first signal connection point, and the connection head is disposed on the housing and is provided with a second signal connection point used to be connected to the external device; in addition, the switch is disposed in the first opening, is respectively connected to the first signal connection point of the circuit board and the second signal connection point of the connection head and is used for controlling the connection or disconnection between the first signal connection point of the circuit board and the second signal connection point of the connection head. Under the condition that the connector is connected to a heavy load, before a user pulls out the connector, signal connection between the circuit board and the connection head is only required to be cut off by means of the switch, that is, the connector and the heavy load are disconnected, so that risks of instant ignition and short circuit caused when the connector is pulled out are avoided, and safety accidents are reduced.

Brief Description of the Drawings

[0022] In order to describe the specific embodiments of the present application or the technical solutions in the prior art more clearly, the accompanying drawings required for describing the specific embodiments or the prior art will be briefly introduced below. In all the accompanying drawings, similar elements or parts are generally marked with similar numerals. In the accompanying drawings, all the elements or parts are not necessarily drawn according to an actual proportion.

Fig. 1 is a schematic view showing an overall structure of a connector according to an embodiment not covered by the claims;

Fig. 2 is a schematic exploded view showing the overall structure of the connector according to the embodiment not covered by the claims;

Fig. 3 is a schematic exploded view showing a housing structure of the connector according to the embodiment not covered by the claims;

Fig. 4 is a schematic exploded view showing a partial structure of the connector according to the embodiment of the not covered by the claims;

Fig. 5 is a schematic view showing an overall structure of the connector according to another embodi-

ment not covered by the claims;

Fig. 6 is a partially sectional view showing the overall structure of the connector according to another embodiment not covered by the claims;

Fig. 7 is a schematic enlarged view showing a structure at part A in Fig. 4;

Fig. 8 is a schematic view showing an overall structure of a first fixing component of the connector according to another embodiment not covered by the claims;

Fig. 9 is a sectional view showing a side of the connector according to the embodiment not covered by the claims;

Fig. 10 is a schematic enlarged view showing a structure at part B in Fig. 9; and

Fig. 11 is a sectional view showing a partial structure of the connector according to an embodiment of the invention.

Detailed Description of the Embodiments

[0023] For facilitating understanding the present disclosure, the present disclosure will be described below in more detail with reference to the accompanying drawings and the specific embodiments. It needs to be noted that when one element is stated as "fixed to" another element, the element may be directly located on another element, or one or more centered elements may exist therebetween. When one element is stated as "connected to" another element, the element may be directly connected to another element, or one or more centered elements may exist therebetween. Terms "vertical", "horizontal", "left", "right" and similar expressions used in the present description are merely for the purpose of description.

[0024] Unless defined otherwise, all technical and scientific terms used in the present description have the same meaning as commonly understood by the ordinary skill in the art to which this technology belongs. In the present description, the terms used in the description of the present application are merely for the purpose of describing specific embodiments, rather than to limit the present application. The term "and/or" used in the present description includes any or all of combinations of one or more listed relevant items.

[0025] With reference to Fig. 1 and Fig. 2, a connector 01 includes a housing 10, a connection head 20, a circuit board 30, a switch 40, a first fixing component 50 and a protection component 60. The connection head 20 is disposed on one end of the housing 10, the circuit board 30 is disposed in the housing 10, both of the first fixing component 50 and the protection component 60 are connect-

ed to the housing 10, and the switch 40 is disposed on the housing 10 and is connected to the connection head 20 and the circuit board 30. The switch 40 is used for controlling the electric connection or disconnection between the connection head 20 and the circuit board 30, and the first fixing component 50 is used to be connected to an external device and enables the connector and the external device to be in a primary fixed state (a primary stable connection state).

[0026] Specifically, for the above-mentioned housing 10, as shown in Fig. 2 and Fig. 3, the housing 10 is provided with an accommodating cavity 10a and a first opening 101 communicating with the accommodating cavity 10a, the accommodating cavity 10a may be used for accommodating the circuit board 30, and the first opening 101 is used for mounting the switch 40.

[0027] In some embodiments, the housing 10 is provided with a second opening 102, and the second opening 102 communicates with the accommodating cavity 10a. The second opening 102 is located between the connection head 20 and the first opening 101 and facilitates a user controlling the first fixing component 50.

[0028] In some embodiments, the housing 10 is provided with a through hole 103 communicating with the accommodating cavity 10a, the through hole 103 and the connection head 20 are located on the same end of the housing 10, and the through hole 103 allows parts of component of the first fixing component 50 to penetrate to fix the external device.

[0029] In some embodiments, a supporting plate 104 is disposed in the housing 10 and is used for fixing the parts of components of the first fixing component 50.

[0030] In some embodiments, an anti-skid bulge 105 is disposed on the outer side wall of the housing 10. When a user holds the connector, the anti-skid bulge 105 may play an anti-skid role to reduce the phenomenon that the connector falls off from a hand of the user, thereby reducing the damage of the connector.

[0031] For the above-mentioned circuit board 30, as shown in Fig. 4, the circuit board 30 is disposed in the accommodating cavity 10a and is provided with a first signal connection point (unshown), and the first signal connection point includes, but is not limited to: an electric signal connection point and a communication signal connection point. The electric signal connection point facilitates electric connection between the circuit board and the connection head, and the communication signal connection point facilitates communication signal connection between the circuit board 30 and the connection head 20.

[0032] In some embodiments, the circuit board 30 is a PCB which may be used as a carrier of an electronic component, thereby being beneficial to the connection among components inside the connector.

[0033] For the above-mentioned connection head 20, as shown in Fig. 4, the connection head 20 is disposed on the housing 10, the connection head 20 includes a second signal connection point (unshown) connected to the external device, the second signal connection point

includes, but is not limited to an electric signal connection point and a communication signal connection point, the electric signal connection point of the second signal connection point is used to be connected to the electric signal connection point of the first signal connection point, and the communication signal connection point of the second signal connection point is used to be connected to the communication signal connection point of the first signal connection point.

[0034] The connection head 20 includes communication signal pins 201 and electric signal pins 202, the communication signal pins 201 are connected to the communication signal connection point of the first signal connection point, the electric signal pins 202 are connected to the electric signal connection point of the first signal connection point, the communication signal pins 201 may be connected to the communication signal connection point of the circuit board 30 under the control of the switch 40, and the electric signal pins 202 are connected to the electric signal connection point of the circuit board 30 under the control of the switch 40. The communication signal pins 201 and the electric signal pins 202 are used to be connected to an external component by a signal, thereby achieving connection between the external component and the communication signal connection point and the electric signal connection point on the circuit board 30.

[0035] In some embodiments, the number of the communication signal pins 201 and the electric signal pins 202 is multiple, the number of the plurality of communication signal pins 201 is eight, and the number of the electric signal pins 202 is two.

[0036] For the above-mentioned switch 40, as shown in Fig. 4, the switch 40 is disposed in the first opening 101, and the switch 40 is respectively connected to the first signal connection point (including the electric signal connection point and the communication signal connection point) of the circuit board 30 and the second signal connection point (including the electric signal connection point and the communication signal connection point) of the connection head 20, and the switch 40 is used for controlling the connection or disconnection between the first signal connection point of the circuit board 30 and the second signal connection point of the connection head 20.

[0037] It may be understood that the switch 40 may be used for controlling the connection or disconnection between the electric signal connection point of the first signal connection point and the electric signal connection point of the second signal connection point. In some embodiments, the switch 40 may be further used for controlling the connection or disconnection between the communication signal connection point of the first signal connection point and the communication signal connection point of the second signal connection point.

[0038] Specifically, the switch 40 includes a switch body 401 and an operation part 402; the switch body 401 is electrically connected to the first signal connection

point of the circuit board 30 and the second signal connection point of the connection head 20, the operation part 402 is located in the first opening 101, is connected to the switch body 401 and is movable relative to the switch body 401; in response to the operation part 402 located on a first preset position relative to the switch body 401, the switch body 401 is switched on to achieve the signal connection between the first signal connection point of the circuit board 30 and the second signal connection point of the connection head 20; and in response to the operation part 402 located on a second preset position relative to the switch body 401, the switch body 401 is switched off to achieve the signal disconnection between the first signal connection point of the circuit board 30 and the second signal connection point of the connection head 20.

[0039] In some embodiments, the operation part 402 is a sliding seat which slides relative to the housing 10 to control the switch body 401 to be switched on or off; when the sliding seat slides to the first preset position, the switch body 401 is switched on, and meanwhile, a limiting and connecting piece 703 is matched with the first fixing component 50, thereby achieving fixation for the state of the first fixing component 50; and when the sliding seat slides to the second preset position, the switch body 401 is switched off, and the limiting and connecting piece 703 and the first fixing component 50 are disconnected.

[0040] It may be understood that the operation part 402 is not limited to the structure of the above-mentioned sliding seat and may also be other structures. For example, as shown in Fig. 5 and Fig. 6, the operation part 402 is a button, it is set that the button is located on the first preset position when being in a pressing state, and the limiting and connecting piece 703 upwards moves and is matched with the first fixing component 50 in the primary fixed state; and it is set that the button is located on the second preset position when being in a springback state, and the limiting and connecting piece 703 downwards moves and is disconnected with the first fixing component 50 in the primary fixed state. It needs to be noted that the purpose of ensuring that the limiting and connecting piece 703 upwards moves during the button in the pressing state and the limiting and connecting piece 703 downwards moves during the button in the springback state may be achieved in a manner including, but not limited to a lever structure.

[0041] The connector further includes a second fixing component 70 connected to the switch 40. As shown in Fig. 4, the second fixing component 70 includes a limiting and connecting piece 703; and the limiting and connecting piece 703 is connected to the operation part 402 and moves with the operation part 402. The limiting and connecting piece 703 is used to be matched with the first fixing component 50 in the primary fixed state when the operation part 402 is toggled to the first preset position, so that fixation for the state of the first fixing component 50 is achieved, and the connection of the external device

and the connector is further in a secondary stable state, that is, the external device is secondarily fixed to ensure that the connector and the external device are in a stable connection and undetachable state when being powered on. When the operation part 402 moves to the second preset position, the limiting and connecting piece 703 is separated from the first fixing component 50 in the primary fixed state to remove the fixation for the state of the first fixing component 50, so that it is further ensured that electric signal connection between the connector and the external device is in a cutoff state before the connector and the external device are to be detached, the risk of ignition or short circuit is avoided, that is, before the primary fixation of the connector and the external device, the secondary fixation has to be removed, and meanwhile, an electric signal is cut off. Optically, the limiting and connecting piece 703 is located in the accommodating cavity 10a.

[0042] In some embodiments, as shown in Fig. 4, the limiting and connecting piece 703 is connected to the switch 40; in response to the switch 40 located on the first preset position, the limiting and connecting piece 703 is matched with the first fixing component 50, so that the first fixing component 50 is in a fixed state relative to the housing 10; and in response to the switch 40 located on the second preset position, the limiting and connecting piece 703 is separated from the first fixing component 50, so that the first fixing component 50 is movable relative to the housing.

[0043] For the above-mentioned first fixing component 50, as shown in Fig. 4 and Fig. 7, the first fixing component 50 is disposed on the housing 10. The first fixing component 50 includes a rotating arm 501, a hook 502 and an elastic element 503; the rotating arm 501 is rotatably connected to the housing 10; the hook 502 is fixed to one end of the first surface of the rotating arm 501; one end of the elastic element 503 is fixed to the other end of the first surface of the rotating arm 501, and the other end of the elastic element 503 is fixed to the supporting plate 104 in the housing 10; and after the other end of the first surface of the rotating arm 501 rotates, the springback of the other end of the first surface of the rotating arm 501 may be achieved by the elastic element 503. It should be noted that the first surface refers to the surface, close to one side of the connection head 20, of the rotating arm 501. The hook 502 is used to clamp the external device and stabilize the physical connection between the connector and the external device when the external device is plugged into the connection head 20, and when the operation part 402 of the switch 40 is located on the first preset position, that is, the switch 40 controls the first signal connection point and the second signal connection point to be connected, the limiting and connecting piece 703 supports against and abuts with the other end of the first surface of the rotating arm 501, the limiting and connecting piece 703 is connected to and limits the rotating arm 501 in the clamped state to fix a first state of the rotating arm, so that the rotating arm 501

is nonrotatable relative to the housing 10, and then, the secondary fixation for the external device is achieved; and when the operation part 402 of the switch 40 is located on the second preset position, that is, the switch 40 controls the first signal connection point and the second signal connection point to be disconnected, the limiting and connecting piece 703 is separated from the other end of the rotating arm 501, the limiting and connecting piece 703 is separated from the rotating arm 501 in the clamped state to remove the fixation for the state of the rotating arm 501, so that the rotating arm 501 is rotatable relative to the housing 10, at the moment, the primary fixation of the connector and the external device has not been removed, but the secondary fixation for the external device has been removed, and meanwhile, the electric signal has been cut off.

[0044] It may be understood that a connection manner between the limiting and connecting piece 703 and the rotating arm 501 is not limited to supporting and abutting and may be other connection manners, such as clamping and threaded connection, as long as the rotating arm 501 is fixed relative to the housing 10 after the limiting and connecting piece 703 is connected to the other end of the rotating arm 501.

[0045] In some embodiments, the hook 502 is located outside the housing 10 and is clamped with the part, located outside the housing 10, of the external device, thereby achieving connection and fixation for the overall external device.

[0046] It should be understood that a structure for achieving fixation for the external device is not limited to the structure of the above-mentioned hook 502, and may also be other structures. For example, as shown in Fig. 8, the hook is replaced with a fixing piece 501 including a first fixing plate 5041, a connecting plate 5042 and a second fixing plate 5043, one end of the first fixing plate 5041 is connected to one end of the connecting plate 5042, one end of the second fixing plate 5043 is connected to the other end of the connecting plate 5042, the fixing piece 504 is U-shaped, the first fixing plate 5041 and the second fixing plate 5043 are spaced to form a fixing groove 504a, and the fixing groove 504a may be used to be clamped in the external device and the connection head 20, thereby achieving connection and fixation for the external device.

[0047] In some embodiments, as shown in Fig. 7, Fig. 9 and Fig. 10, the rotating arm 501 is located in the accommodating cavity 10a, one end of the rotating arm 501 extends out of the through hole 103, the rotating arm 501 is swingable relative to the through hole 103, the other end of the rotating arm 501 is exposed out of the second opening 102, and a user may directly press the other end of the rotating arm 501 at the second opening 102 to make the rotating arm 501 rotate, and thus, the disconnection or connection between the hook 502 disposed on one end of the rotating arm 501 and the external device may be achieved, and the external device may be freely disconnected or connected to the connection head 20.

[0048] In some embodiments, a fixing groove 5012 is disposed in the other end of the first surface of the rotating arm 501, and the fixing groove 5012 is used to accommodate and fix one end of the elastic element 503.

[0049] In some embodiments, a clamping groove (unshown) is disposed in the other end of the first surface of the rotating arm 501, and the clamping groove is used for clamping the limiting and connecting piece 703 to limit the rotation of the rotating arm 501, and the rotating arm 501 is fixed relative to the housing 10.

[0050] In some embodiments, the other end of a second surface of the rotating arm 501 extends towards the second opening 102 to form a fixing button 5011, and the fixing button 5011 is movable relative to the second opening 102. By pressing the fixing button 5011, the rotating arm 501 is driven to rotate, and thus, the disconnection or connection between the hook 502 disposed on one end of the rotating arm 501 and the external device may be achieved, and the external device may be freely disconnected or connected to the connection head 20. It should be noted that the second surface is opposite to the first surface, and the second surface refers to the surface, away from one side of the connection head 20, of the rotating arm 501.

[0051] In some other embodiments, the first fixing component 50 and the second fixing component 70 are not limited to the structures as shown in Fig. 1 to Fig. 10, and may also adopt other manners. As shown in Fig. 11, the first fixing component 50 includes a threaded structure or clamping structure disposed on the connection head, the threaded structure or clamping structure is matched with the external device so that the connector and the external device are in a primary fixed state of threaded connection or clamping. The second fixing component 70 includes a connecting arm 701 and a fixing head 702, the fixing head 702 is disposed on one end of the connecting arm 701, and the other end of the connecting arm 701 is connected to the switch 40.

[0052] After the threaded connection or clamping between the connection head of the connector and the external device is completed, in response to the first signal connection point and the second signal connection point being controlled to be connected by the switch, the switch 40 drives the connecting arm 701 to move to a direction close to the connection head 20, and the fixing head 702 is fixedly connected to the external device to secondarily fix the external device in the primary fixed state (threaded connection or clamped state), so that the external device and the connector are undetachable. In response to the first signal connection point and the second signal connection point being controlled to be disconnected by the switch, the switch 40 drives the connecting arm 701 to move to a direction away from the connection head 20, and the fixing head 702 is separated from the external device to remove the secondary fixed state of the external device, at the moment, the external device and the connection head 20 are detachable. It may be understood that the connecting arm 701 and the switch 40 may be

fixed in a manner such as welding and threaded connection.

[0053] For the above-mentioned protection component 60, as shown in Fig. 2, the protection component 60 includes a protection cover 601 and an elastic connecting piece 602, one end of the elastic connecting piece 602 is connected to the housing 10, the other end of the elastic connecting piece 602 is connected to the protection cover 601, and the protection cover 601 covers the connection head 20. When the connector is in an unused state, the protection cover 601 covers the connection head 20, so that the phenomenon that the communication signal pins 201 and the electric signal pins 202 in the connection head 20 are exposed in the air and are in contact with water in the air is reduced.

[0054] In an embodiment of the present application, the housing 10, the circuit board 30, the connection head 20 and the switch 40 are disposed, wherein the housing 10 is provided with the accommodating cavity 10a and the first opening 101 communicating with the accommodating cavity 10a, the circuit board 30 is disposed in the accommodating cavity 10a and is provided with the first signal connection point, and the connection head 20 is disposed on the housing 10 and is provided with a second signal connection point used to be connected to the external device; in addition, the switch 40 is disposed in the first opening 101, is respectively connected to the first signal connection point of the circuit board 30 and the second signal connection point of the connection head 20 and is used for controlling the connection or disconnection between the first signal connection point of the circuit board 30 and the second signal connection point of the connection head 20. Under the condition that the connector is connected to a heavy load, before a user pulls out the connector, signal connection between the circuit board 30 and the connection head 20 is only required to be cut off by means of the switch 40, that is, the connector and the heavy load are disconnected, so that risks of instant ignition and short circuit caused when the connector is pulled out are avoided, and safety accidents are reduced.

[0055] By disposing the first fixing component 50 used to be stably connected to the external device on the connector and disposing the second fixing component 70 on the switch 40, when the switch 40 controls the first signal connection point and the second signal connection point to be connected, the second fixing component 70 is matched with the first fixing component in the primary fixed state, so that the connection between the external device and the connector is in a secondary stable state to ensure that the connector and the external device are in a stable connection and undetachable state when being powered on. When the switch 40 controls the first signal connection point and the second signal connection point to be disconnected, the second fixing component 70 is separated from the first fixing component 50 in the primary fixed state to remove the fixation for the state of the first fixing component, so that it is further ensured

that a signal (particularly, an electric signal) between the connector and the external device is in a cutoff state before the connector and the external device are detached, and the risk of ignition or short circuit is avoided.

[0056] When the connector is required to be connected to the external device (a heavy-load device or a power source), firstly, the connection head 20 of the connector is connected to the external device, then, the external device is subjected to primary stable fixation by the first fixing assembly 50, and then, the switch 40 is switched on, so that signal communication (electric connection and the like) between the heavy load and the connector is achieved, meanwhile, the state of the first fixing component 50 is fixed by the second fixing component 70, and the connector is stably connected to the external device and is undetachable. When the connector is required to be detached to be disconnected with the external device, the switch 40 has to be firstly switched off to cut off the signal connection between the heavy load and the connector and remove the fixation for the state of the first fixing component 50 at the same time, and thus, the connector is subsequently allowed to be detached from the external device.

[0057] The present application further provides an embodiment of an electronic device. The electronic device includes the above-mentioned connector 01, and the function and structure of the connector 01 may refer to those in the above-mentioned embodiments, the descriptions thereof are omitted herein.

[0058] The above descriptions are not intended to limit the patent scope of the present application, but merely used as embodiments thereof.

Claims

1. A connector (01) for connection to an external device comprising:

a housing (10) provided with an accommodating cavity (10a) and a first opening (101) communicating with the accommodating cavity (10a); a first connection point;
a connection head (20) disposed on the housing (10), the connection head (20) comprising a second signal connection point used to be connected to the external device; and
a switch (40) disposed in the first opening (101); wherein the connector (01) comprises a first fixing component (50), the first fixing component (50) is disposed on the housing (10) or the connection head (20), and the first fixing component (50) is used to be connected to the external device and enables the connector (01) and the external device to be in a primary fixed state; the connector (01) comprises a second fixing component (70), and the second fixing component (70) is connected to the switch (40);

in response to the first signal connection point and the second signal connection point being controlled to be connected by the switch (40), the switch (40) drives the second fixing component (70) to be matched with the first fixing component (50) or the external device in the primary fixed state to achieve secondary fixation for the external device, so that the external device and the connector are in an undetachable state; and

in response to the first signal connection point and the second signal connection point being controlled to be disconnected by the switch (40), the switch (40) drives the second fixing component (70) to be separated from the first fixing component (50) or the external device in the primary fixed state to remove the secondary fixation for the external device, so that the external device and the connector are in a detachable state;

characterized in that, the connector further comprises:

a circuit board (30) disposed in the accommodating cavity (10a); the circuit board (30) being provided with the first signal connection point; the switch (40) being respectively connected to the first signal connection point of the circuit board (30) and the second signal connection point of the connection head (20), and the switch (40) being used for controlling the connection or disconnection between the first signal connection point of the circuit board (30) and the second signal connection point of the connection head (20);

the first fixing component (50) comprises a threaded structure or clamping structure disposed on the connection head, the threaded structure or clamping structure is matched with the external device so that the connector and the external device are in a threaded connection or clamped state;

the second fixing component (70) comprises a connecting arm (701) and a fixing head (702), the fixing head (702) is disposed on one end of the connecting arm (701), the other end of the connecting arm (701) is connected to the switch (40), and the fixing head (702) is used to be fixedly connected to the external device;

in response to the first signal connection point and the second signal connection point being controlled to be connected by the switch (40), the switch (40) drives the fixing head (702) to be fixedly connected to the external device in the threaded connection or clamped state to achieve the secondary fixation for the external

device; and
 in response to the first signal connection point and the second signal connection point being controlled to be disconnected by the switch (40), the switch (40) drives the fixing head (702) to be separated from the external device in the threaded connection or clamped state to remove the secondary fixation for the external device.

2. The connector according to claim 1, **characterized in that** the first signal connection point comprises an electric signal connection point and a communication signal connection point; the connection head (20) comprises a plurality of electric signal pins (201) and a plurality of communication signal pins (202), the plurality of electric signal pins (201) are connected to the electric signal connection point of the first signal connection point, the plurality of communication signal pins (202) are connected to the communication signal connection point of the first signal connection point, the number of the plurality of electric signal pins (201) is two, and the number of the plurality of communication signal pins (202) is eight.
3. An electronic device, **characterized by** comprising the connector (01) of any one of claims 1 or 2.

Patentansprüche

1. Verbinder (01) zur Verbindung mit einer externen Vorrichtung, umfassend:

ein Gehäuse (10), das einen Aufnahmehohlraum (10a) und eine erste Öffnung (101), die mit dem Aufnahmehohlraum (10a) kommuniziert, bereitstellt;
 einen ersten Verbindungspunkt;
 einen Verbindungskopf (20), der an dem Gehäuse (10) angeordnet ist, der Verbindungskopf (20), umfassend einen zweiten Signalverbindungspunkt, der zum Verbinden mit der externen Vorrichtung verwendet wird; und
 einen Schalter (40), der in der ersten Öffnung (101) angeordnet ist;
 wobei der Verbinder (01) eine erste Komponente (50) zum Befestigen umfasst, die erste Komponente zum Befestigen (50) an dem Gehäuse (10) oder dem Verbindungskopf (20) angeordnet ist und die erste Komponente zum Befestigen (50) zum Verbinden mit der externen Vorrichtung verwendet wird und ermöglicht, dass der Verbinder (01) und die externe Vorrichtung in einem primär befestigten Zustand sind; der Verbinder (01) eine zweite Komponente zum Befestigen (70) umfasst und die zweite Komponente zum Befestigen (70) mit dem Schalter (40)

verbunden ist;

als Reaktion darauf, dass der erste Signalverbindungspunkt und der zweite Signalverbindungspunkt gesteuert werden, damit sie durch den Schalter (40) verbunden werden, treibt der Schalter (40) die zweite Komponente zum Befestigen (70) an, um mit der ersten Komponente zum Befestigen (50) oder der externen Vorrichtung im primär fixierten Zustand übereinzustimmen, um eine sekundäre Befestigung für die externe Vorrichtung zu erreichen, sodass die externe Vorrichtung und der Verbinder in einem nicht abnehmbaren Zustand sind; und
 als Reaktion darauf, dass der erste Signalverbindungspunkt und der zweite Signalverbindungspunkt gesteuert werden, damit sie durch den Schalter (40) getrennt werden, treibt der Schalter (40) die zweite Komponente zum Befestigen (70) an, um von der ersten Komponente zum Befestigen (50) oder der externen Vorrichtung im primär fixierten Zustand getrennt zu werden, um die sekundäre Befestigung für die externe Vorrichtung zu entfernen, sodass die externe Vorrichtung und der Verbinder in einem abnehmbaren Zustand sind;
dadurch gekennzeichnet, dass der Verbinder ferner Folgendes umfasst:

eine Leiterplatte (30), die in dem Aufnahmehohlraum (10a) angeordnet ist; die Leiterplatte (30) mit dem ersten Signalverbindungspunkt bereitgestellt ist;
 den Schalter (40), der jeweils mit dem ersten Signalverbindungspunkt der Leiterplatte (30) und dem zweiten Signalverbindungspunkt des Verbindungskopfes (20) verbunden ist, und der Schalter (40) zum Kontrollieren der Verbindung oder Trennung zwischen dem ersten Signalverbindungspunkt der Leiterplatte (30) und dem zweiten Signalverbindungspunkt des Verbindungskopfes (20) verwendet wird;
 die erste Komponente zum Befestigen (50), die eine Schraubstruktur oder eine Klemmstruktur umfasst, die auf dem Verbindungskopf angeordnet ist, wobei die Schraubstruktur oder die Klemmstruktur mit der externen Vorrichtung übereinstimmt, sodass sich der Verbinder und die externe Vorrichtung in einer Schraubverbindung oder in einem befestigten Zustand befinden;
 die zweite Komponente zum Befestigen (70), die einen Verbindungsarm (701) und einen Befestigungskopf (702) umfasst, der Befestigungskopf (702) an einem Ende des Verbindungsarms (701) angeordnet ist, das andere Ende des Verbindungsarms (701)

- mit dem Schalter (40) verbunden ist, und der Befestigungskopf (702) zum festen Verbinden mit der externen Vorrichtung verwendet wird;
- als Reaktion darauf, dass der erste Signalverbindungspunkt und der zweite Signalverbindungspunkt gesteuert werden, damit sie durch den Schalter (40) verbunden werden, treibt der Schalter (40) den Befestigungskopf (702) an, um mit der externen Vorrichtung in der Schraubverbindung oder im befestigten Zustand fest verbunden zu sein, um die sekundäre Befestigung für die externe Vorrichtung zu erreichen; und
- als Reaktion darauf, dass der erste Signalverbindungspunkt und der zweite Signalverbindungspunkt gesteuert werden, damit sie durch den Schalter (40) getrennt werden, treibt der Schalter (40) den Befestigungskopf (702) an, um von der externen Vorrichtung in der Schraubverbindung oder im befestigten Zustand getrennt zu werden, um die sekundäre Befestigung für die externe Vorrichtung zu entfernen.
2. Verbinder nach Anspruch 1, **dadurch gekennzeichnet, dass** der erste Signalverbindungspunkt einen elektrischen Signalverbindungspunkt und einen Kommunikationssignalverbindungspunkt umfasst; der Verbindungskopf (20) umfasst eine Vielzahl von elektrischen Signalstiften (201) und eine Vielzahl von Kommunikationssignalstiften (202), die Vielzahl von elektrischen Signalstiften (201) ist mit dem elektrischen Signalverbindungspunkt des ersten Signalverbindungspunkts verbunden, die Vielzahl von Kommunikationssignalstiften (202) ist mit dem Kommunikationssignalverbindungspunkt des ersten Signalverbindungspunkts verbunden, und die Anzahl der Vielzahl von elektrischen Signalstiften (201) ist zwei, und die Anzahl der Vielzahl von Kommunikationssignalstiften (202) ist acht.
3. Elektronische Vorrichtung, **dadurch gekennzeichnet, dass** sie den Verbinder (01) nach einem der Ansprüche 1 oder 2 umfasst.

Revendications

1. Connecteur (01) pour une connexion à un dispositif externe comprenant :
- un boîtier (10) doté d'une cavité de logement (10a) et d'une première ouverture (101) communiquant avec la cavité de logement (10a) ;
- un premier point de connexion ;
- une tête de connexion (20) disposée sur le boîtier (10), la tête de connexion (20) comprenant

un deuxième point de connexion de signal utilisé pour être connecté au dispositif externe ; et

un commutateur (40) disposé dans la première ouverture (101) ;

dans lequel le connecteur (01) comprend un premier composant de fixation (50), le premier composant de fixation (50) est disposé sur le boîtier (10) ou la tête de connexion (20), et le premier composant de fixation (50) est utilisé pour être connecté au dispositif externe et permet au connecteur (01) et au dispositif externe d'être dans un état fixé primaire ; le connecteur (01) comprend un deuxième composant de fixation (70), et le deuxième composant de fixation (70) est connecté au commutateur (40) ;

en réponse au fait que le premier point de connexion de signal et le deuxième point de connexion de signal sont commandés pour être connectés par le commutateur (40), le commutateur (40) entraîne le deuxième composant de fixation (70) à être mis en correspondance avec le premier composant de fixation (50) ou le dispositif externe dans l'état fixé primaire pour accomplir une fixation secondaire pour le dispositif externe, de sorte que le dispositif externe et le connecteur soient dans un état indétachable ; et

en réponse au fait que le premier point de connexion de signal et le deuxième point de connexion de signal sont commandés pour être déconnectés par le commutateur (40), le commutateur (40) entraîne le deuxième composant de fixation (70) à être séparé du premier composant de fixation (50) ou du dispositif externe dans l'état fixé primaire pour enlever la fixation secondaire pour le dispositif externe, de sorte que le dispositif externe et le connecteur soient dans un état détachable ;

caractérisé en ce que le connecteur comprend en outre :

une carte de circuit (30) disposée dans la cavité de logement (10a) ; la carte de circuit (30) étant dotée du premier point de connexion de signal ;

le commutateur (40) étant connecté respectivement au premier point de connexion de signal de la carte de circuit (30) et au deuxième point de connexion de signal de la tête de connexion (20), et le commutateur (40) étant utilisé pour commander la connexion ou la déconnexion entre le premier point de connexion de signal de la carte de circuit (30) et le deuxième point de connexion de signal de la tête de connexion (20) ;

le premier composant de fixation (50) comprend une structure filetée ou une structure de serrage disposée sur la tête de connexion, la structure filetée ou la structure de

serrage est mise en correspondance avec le dispositif externe de sorte que le connecteur et le dispositif externe soient dans une connexion filetée ou dans un état serré ;
 le deuxième composant de fixation (70) 5
 comprend un bras de connexion (701) et une tête de fixation (702), la tête de fixation (702) est disposée à une extrémité du bras de connexion (701), l'autre extrémité du bras de connexion (701) est connectée au commutateur (40), et la tête de fixation (702) 10
 est utilisée pour être connectée fixement au dispositif externe ;
 en réponse au fait que le premier point de connexion de signal et le deuxième point de connexion de signal sont commandés pour être connectés par le commutateur (40), le commutateur (40) entraîne la tête de fixation (702) à être connectée fixement au dis- 15
 positif externe dans la connexion filetée ou dans l'état serré pour accomplir la fixation secondaire pour le dispositif externe ; et
 en réponse au fait que le premier point de connexion de signal et le deuxième point de connexion de signal sont commandés pour 20
 être déconnectés par le commutateur (40), le commutateur (40) entraîne la tête de fixation (702) à être séparée du dispositif externe dans la connexion filetée ou dans l'état serré pour enlever la fixation secondaire 25
 pour le dispositif externe 30

2. Connecteur selon la revendication 1, **caractérisé en ce que** le premier point de connexion de signal comprend un point de connexion de signal électrique et un point de connexion de signal de communication ; la tête de connexion (20) comprend une pluralité de broches de signal électrique (201) et une pluralité de broches de signal de communication (202), la pluralité de broches de signal électrique (201) sont connectées au point de connexion de signal électrique du premier point de connexion de signal, la pluralité de broches de signal de communication (202) sont connectées au point de connexion de signal de communication du premier point de connexion de signal, le nombre de la pluralité de broches de signal électrique (201) est égal à deux, et le nombre de la pluralité de broches de signal de communication (202) est égal à huit. 35
40
45
50
3. Dispositif électronique, **caractérisé en ce qu'il** comprend le connecteur (01) selon la revendication 1 ou 2. 55

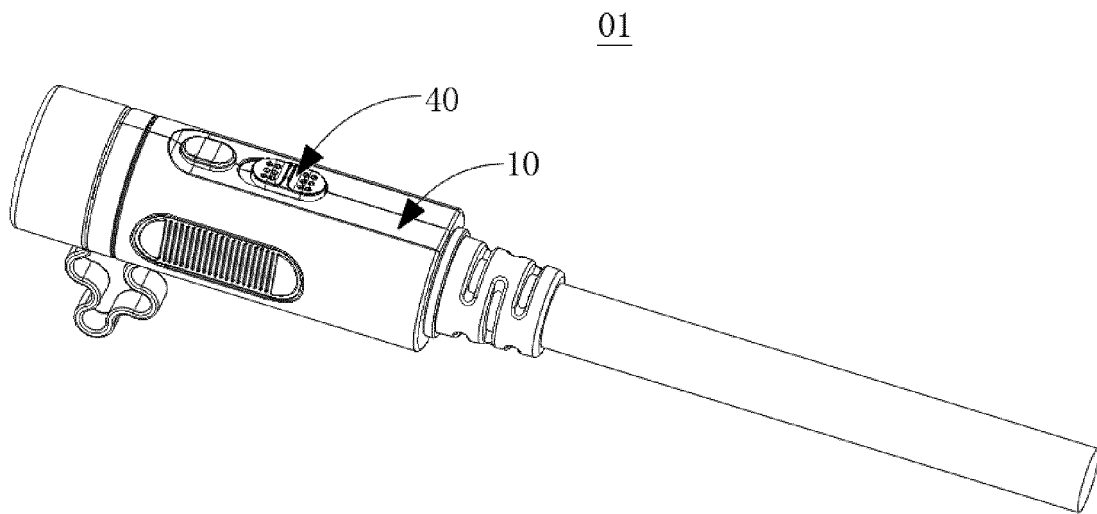


FIG. 1

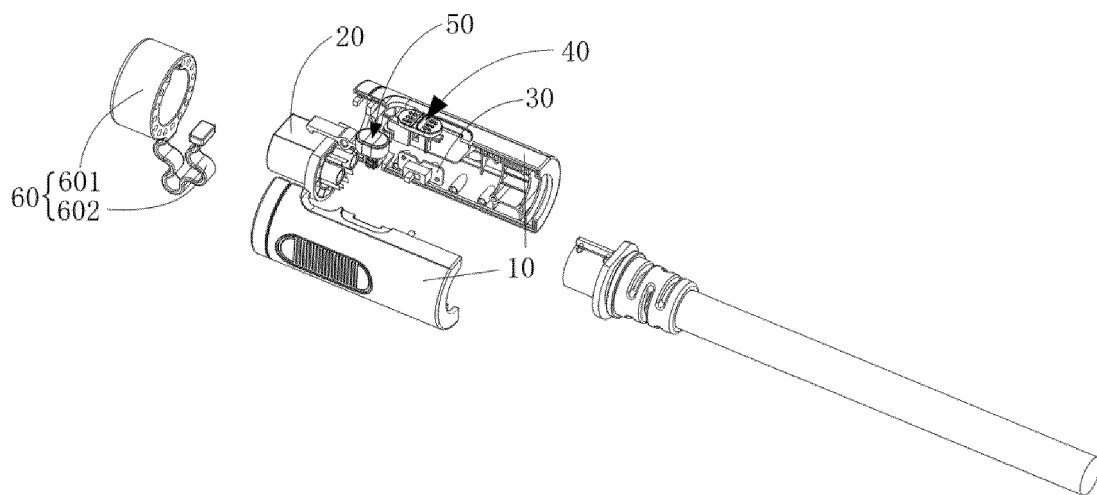


FIG. 2

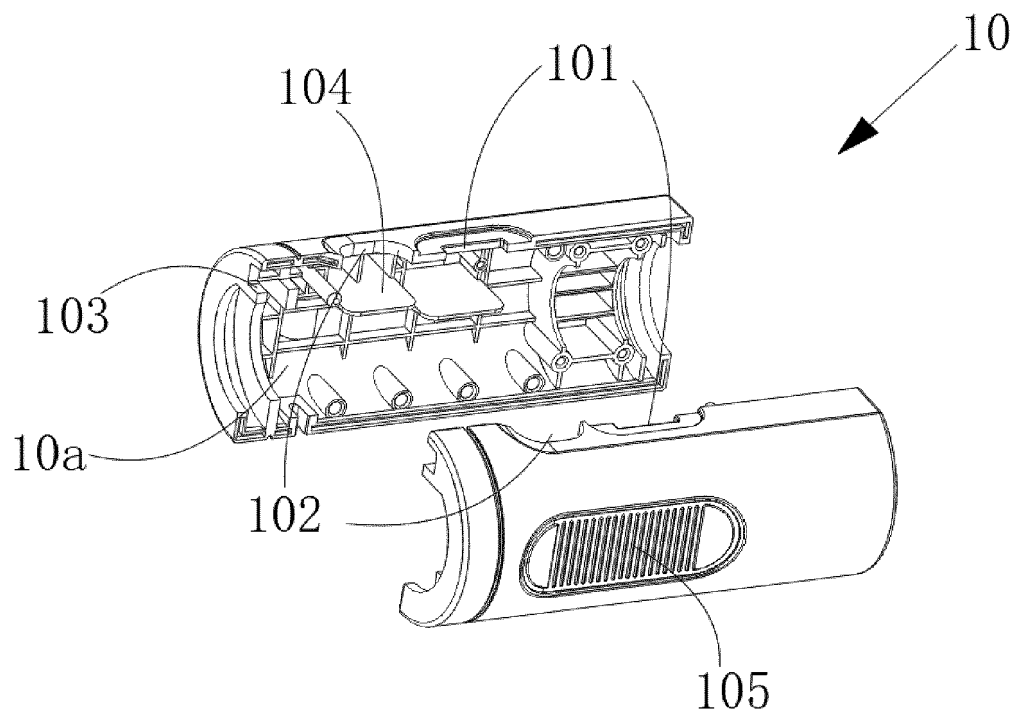


FIG. 3

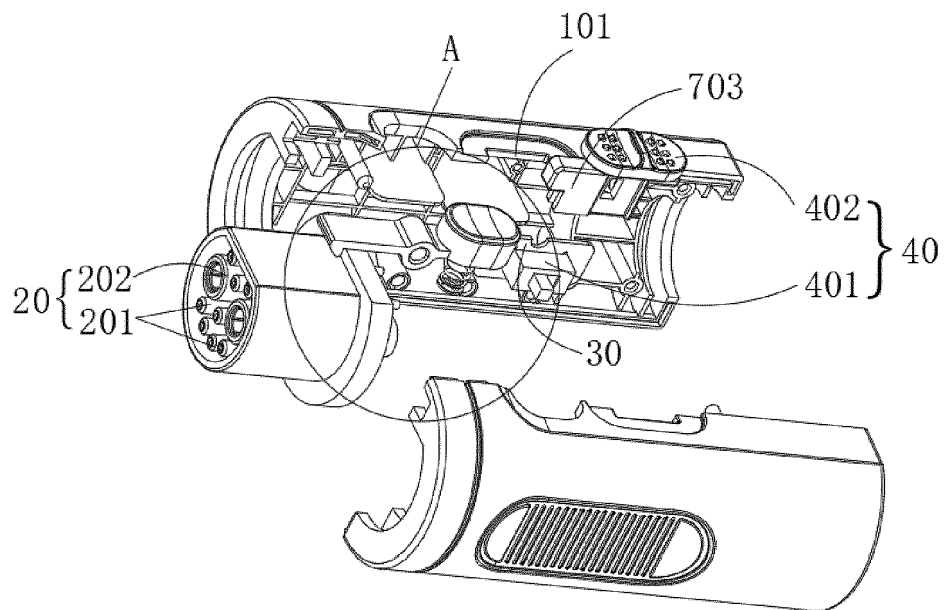


FIG. 4

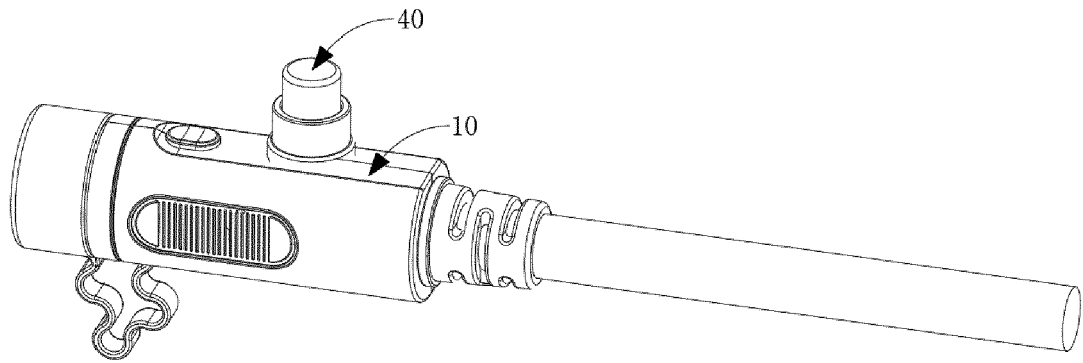


FIG. 5

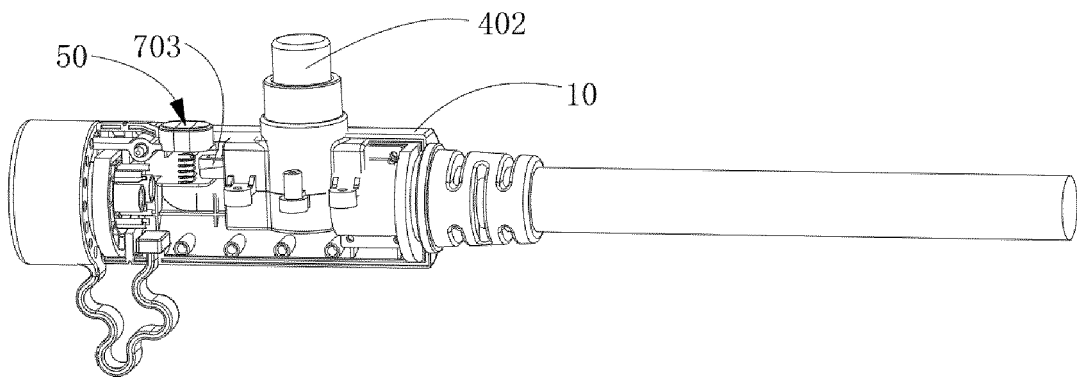


FIG. 6

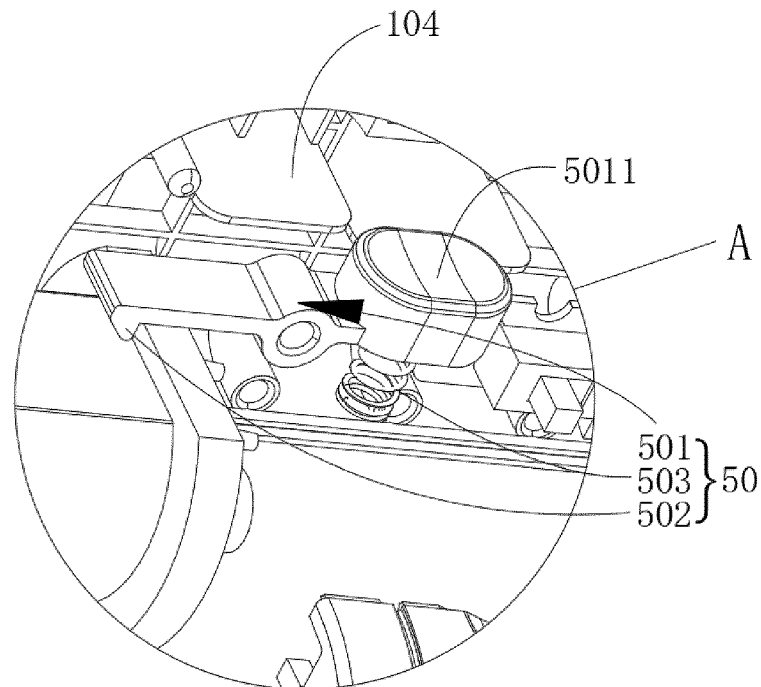


FIG. 7

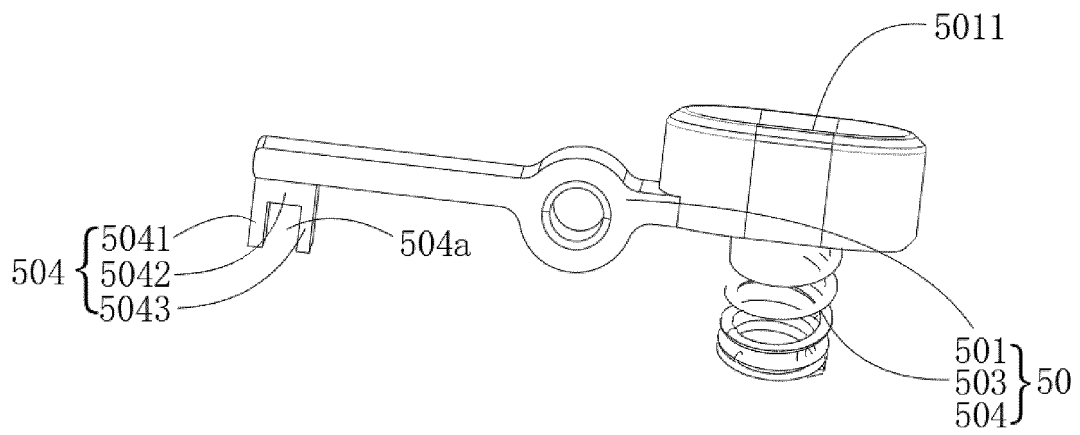


FIG. 8

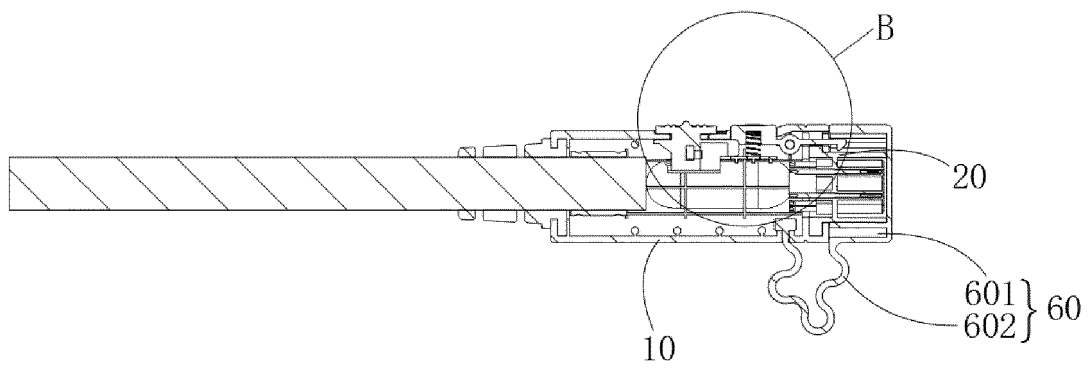


FIG. 9

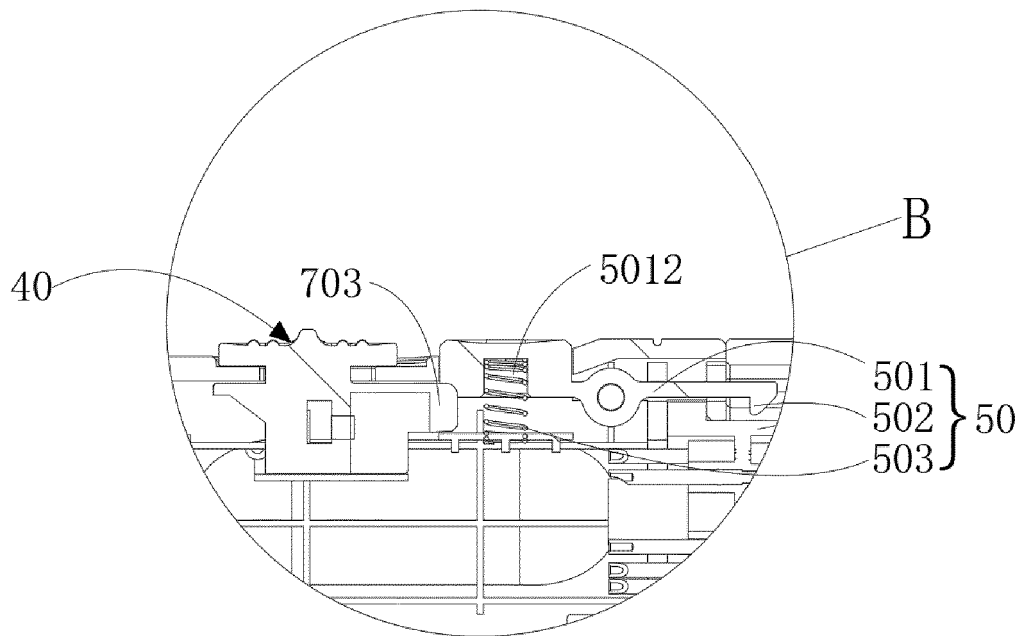


FIG. 10

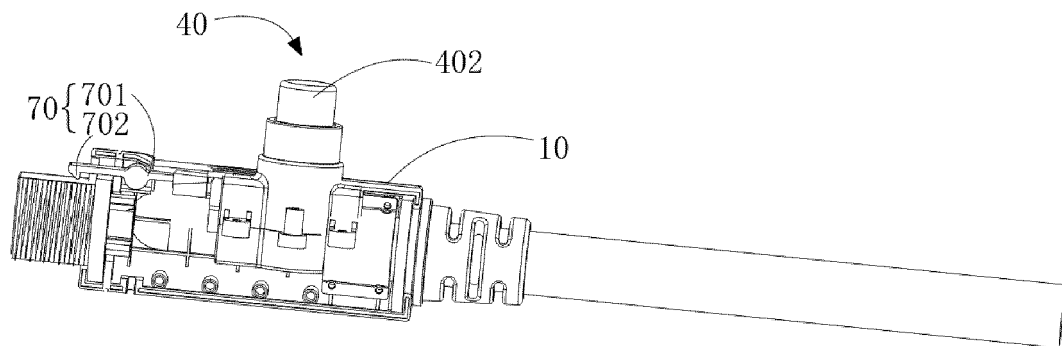


FIG. 11

REFERENCES CITED IN THE DESCRIPTION

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